US Army Corps of Engineers
Baltimore District

Notice of Availability

JENNINGS RANDOLPH LAKE MASTER PLAN 1997 UPDATE AND INTEGRATED ENVIRONMENTAL IMPACT STATEMENT

ALL INTERESTED PARTIES:

The U.S. Army Corps of Engineers, Baltimore District, has prepared the Draft Jennings Randolph Lake Master Plan 1997 Update and Integrated Environmental Impact Statement (EIS) to address potential future development at, and to update the NEPA documentation for the operation of, Jennings Randolph Lake, Garrett County, Maryland, and Mineral County, West Virginia. In accordance with the National Environmental Policy Act (NEPA), the District is conducting public coordination and distributing the documents for public review and comment. The public review and comment period for the Draft Master Plan Update and Integrated EIS will begin on July 31, 1997, and end on September 16, 1997.

Jennings Randolph Lake is located on the North Branch of the Potomac River in Garrett County, Maryland, and Mineral County, West Virginia, approximately 8 miles upstream of Bloomington, Maryland, and approximately 5 miles north of Elk Garden, West Virginia. The dam is a multi-purpose project authorized for flood protection, water quality, recreation, and water supply.

The 1995 Energy and Water Development Appropriations Act (Public Law 103-316, 108 Stat. 1701, dated 26 August 1994) authorized the Jennings Randolph Lake Master Plan 1997 Update. The original Master Plan for Jennings Randolph Lake was completed in 1973. The current update reevaluates the assets, needs, and potential of the project. The 1997 Master Plan Update reflects changes that have occurred to the site, in the region, in recreation trends, and in Corps policy in the years since the original Master Plan was completed. The purpose of the update is to provide a guide for the use and development of natural and constructed resources on Corps fee-owned lands at Jennings Randolph Lake. The Master Plan is the basic document guiding Corps responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the project lands, waters, and associated resources.

The Draft Master Plan has been prepared in accordance with Engineering Regulation (ER) 1130-2-550, dated November 1996. This regulation prescribes "an overall land and water management plan, resource objectives, and associated design and management concepts" that provides the "best possible combination of response to regional needs, resource capabilities and suitabilities, and expressed public interests and desires consistent with authorized project purpose." Additionally, as specified in the regulation, the Master Plan contributes to "providing a high degree of recreation diversity within the region;" emphasizes the "particular qualities, characteristics, and potentials of the project;" and exhibits "consistency and compatibility with national objectives and other state and regional goals and programs." The decision to implement the proposed future development at Jennings Randolph Lake is based on an evaluation of the probable impact of the proposed activities on the environment, as well as public interest. Factors being considered include regional economics, general environmental concerns, wetlands, cultural resources, flood hazards, fish and wildlife resources, flood plain management, land use, recreation, water supply, water quality, aesthetics, energy needs, regional and local infrastructure, hazardous and toxic materials, public health and safety, food and fiber production, and the general needs and welfare of the people.

Comments on the Draft Master Plan and Integrated EIS from the public and from Federal, state, and local agencies and officials, will be considered in the decision to implement the Master Plan at the project, and will be incorporated into the Final Master Plan and Integrated Environmental Impact Statement. Public comments will also be used to determine the overall public interest. A public meeting will be held on Thursday, August 14, 1997, from 7:00 to 9:00 p.m, at the Mineral County Health Center, Harley O. Staggers Sr. Drive, Keyser, West Virginia.

This Notice of Availability is being sent to organizations and individuals known to have an interest in the Master Plan Update. Please bring this notice to the attention of any other individuals with an interest in this matter. Copies of the Draft Jennings Randolph Lake Master Plan 1997 Update and Integrated EIS are available for review at the following locations:

Keyser/Mineral County Public Library, 105 North Main Street, Keyser, West Virginia

Fort Ashby Public Branch Library, Fort Ashby, West Virginia

Piedmont Library, Childs Avenue, Piedmont, West Virginia

Allegheny Mountain Top Public Library, Mount Storm, West Virginia

Cumberland Public Library, 31 Washington Street, Cumberland, Maryland

Garrett County Public Library, 6 North 2nd Street, Oakland, Maryland

Westernport Public Library, 66 Main Street, Westernport, Maryland

Frostburg Library, 90 East Main Street, Frostburg, Maryland

La Vale Library, 815 National Highway, La Vale, Maryland

Requests for copies of the Draft Report and EIS may be mailed to the following address:

District Engineer
ATTN: CENAB-OP-TR (Evans)
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

FOR THE COMMANDER:

RONALD A. CUCINA
Acting Chief, Operations Division

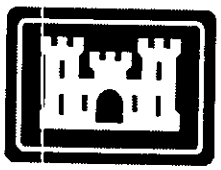
DATE: JUL 2 3 1997

DRAFT

Jennings Randolph Lake
1997 Master Plan Update
and
Integrated Programmatic Environmental Impact Statement

Prepared by:

U.S. Army Corps of Engineers
Baltimore District



July 1997

US Army Corps
of Engineers
Baltimore District

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

Jennings Randolph Lake, Maryland and West Virginia

1997 Master Plan Update And Integrated Programmatic Environmental Impact Statement

JULY 1997

NOTE TO THE READER: The Environmental Impact Statement (EIS) for this project has been integrated into the following Master Plan in accordance with Engineering Regulation (ER) 1130-2-550, dated November 1996, and ER 200-2-2, dated June 1996. Sections of the report that are required for compliance with the National Environmental Policy Act (NEPA) are noted by an asterisk (*) in the Table of Contents.

LOCATION OF PROPOSED ACTION: Jennings Randolph Lake is located on the North Branch of the Potomac River in Garrett County, Maryland, and Mineral County, West Virginia, approximately 8 miles upstream of Bloomington, Maryland, and approximately 5 miles north of Elk Garden, West Virginia.

DISTRICT CONTACT: Ms. Lacy Evans
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ABSTRACT: The Jennings Randolph Lake 1997 Master Plan Update and Integrated Programmatic Environmental Impact Statement updates the existing Master Plan, written in 1973, and the original environmental documentation for the project. These actions are necessary because of the age of these documents and because the scope of possible activities at the project have broadened considerably since its construction. The improved water quality at the lake has presented an opportunity to include water contact activities in the project's recreational activities. The updated plan reflects changes that have occurred to the site, in the region, in recreation trends, and in Corps policy in the years since the original master plan was completed. The purpose of the update is to guide the use and development of natural and constructed resources on Corps fee-owned lands at Jennings Randolph Lake. The Master Plan is the basic document guiding Corps responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the project lands, waters, and associated resources. The integrated Environmental Impact Statement is a programmatic document which is designed to address the current operation of the lake and its facilities and evaluate the proposed level of future development. Additional National Environmental Policy Act (NEPA) documentation may be required for any construction activities undertaken as a result of the updated Master Plan.

COMMENT PERIOD DATES: The comment period will begin on July 31, 1997, and end on September 16, 1997.

JENNINGS RANDOLPH LAKE, MARYLAND AND WEST VIRGINIA

1997 Master Plan Update And Integrated Programmatic Environmental Impact Statement

EXECUTIVE SUMMARY

General: Jennings Randolph Lake is located on the North Branch of the Potomac River in Garrett County, Maryland, and Mineral County, West Virginia, approximately 8 miles upstream of Bloomington, Maryland, and approximately 5 miles north of Elk Garden, West Virginia. The dam is a multi-purpose project authorized for flood protection, water quality, recreation, and water supply.

The 1995 Energy and Water Development Appropriations Act (Public Law 103-316, 108 Stat. 1701, dated 26 August 1994) authorized the Jennings Randolph Lake Master Plan 1997 Update. The original Master Plan for Jennings Randolph Lake was completed in 1973. The current update reevaluates the assets, needs, and potential of the project. The 1997 Master Plan Update reflects changes that have occurred to the site, in the region, in recreation trends, and in Corps policy in the years since the original master plan was completed. The purpose of the update is to provide a guide for the use and development of natural and constructed resources on Corps fee-owned lands at Jennings Randolph Lake. The Master Plan is the basic document guiding Corps responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the project lands, waters, and associated resources.

The integrated Environmental Impact Statement is a programmatic document which is designed to address the current operation of the lake and its facilities and evaluate the proposed level of future development. Additional National Environmental Policy Act (NEPA) documentation will be required for any construction activities undertaken as a result of the updated Master Plan.

The updated Master Plan has been prepared in accordance with Engineering Regulation (ER) 1130-2-550, dated November 1996. This regulation prescribes "an overall land and water management plan, resource objectives, and associated design and management concepts" that provides the "best possible combination of response to regional needs, resource capabilities and suitabilities, and expressed public interests and desires consistent with authorized project purpose." Additionally, as specified in the regulation, the master plan contributes to "providing a high degree of recreation diversity within the region;" emphasizes the "particular qualities, characteristics, and potentials of the project;" and exhibits "consistency and compatibility with national objectives and other state and regional goals and programs." The decision to implement the proposed future development at Jennings Randolph Lake is based on an evaluation of the probable impact of the proposed activities on the environment, as well as public interest. Factors being considered include regional economics, general environmental concerns, wetlands, cultural resources, flood hazards, fish and wildlife resources, flood plain management, land use, recreation, water supply, water quality, aesthetics, energy needs, regional and local infrastructure, hazardous and toxic materials, public health and safety, food and fiber production, and the general needs and welfare of the people.

Comments on the Draft Master Plan and Integrated EIS from the public and from Federal, state, and local agencies and officials, will be considered in the decision to implement the updated Master Plan at the project, and will be incorporated into the Final Master Plan and Integrated Environmental Impact Statement. Public comments will also be used to determine the overall public interest.

Major Conclusions: Based on an analysis of regional economic and recreational needs, a recommended plan for development was formulated for Jennings Randolph Lake. The recommended plan is comprised of 9 recreation sites and 20 features. These features include new recreation areas, new facilities, improved existing facilities, increased area-wide programs and projects, and improved infrastructure. The proposed facilities could be funded through a variety of sources such as O&M funds, cost-sharing partnerships, congressional appropriations, private funding (concessions), or other Federal and State agency funding.

Area of Controversy: As with any multi-purpose project, there are competing interests for a limited number of resources at Jennings Randolph Lake. No major disagreements among agency and public interests were identified during the course of the study. There are no unresolved controversies.

Unresolved Issues: At this time there are no unresolved issues.

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Jennings Randolph Master Plan, 1997 Update/Programmatic EIS

NOTE: * - Indicates information required for National Environmental Policy Act Compliance

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SECTION 1

INTRODUCTION

1.1 Study Purpose

The Jennings Randolph Lake Master Plan 1997 Update and Integrated Programmatic Environmental Impact Statement serves four main purposes. First, the document provides an analysis of and guidance for future recreational development activities at the project. The scope of possible recreational activities at the project have broadened considerably since the lake's construction, primarily due to improved water quality. The demand for recreational facilities has also increased in the region, and recent analysis indicates that the lake cannot currently meet those demands. Second, the document provides an analysis of the local and regional economic benefit to be gained by improving recreational resources at the lake. Third, this document updates the existing Master Plan, written in 1973. Fourth, the document serves as a National Environmental Policy Act compliance document for project operations; updating the original environmental documentation for the project. The document update actions are necessary because of the age of these documents, and because of the increased scope of possible activities at the lake.

The current Master Plan Update presents a re-evaluation of the assets, needs, and potentials of the project. The updated plan reflects changes that have occurred to the site, in the region, in recreation trends, and in Corps policy in the years since the original master plan was completed. The Master Plan is the basic document guiding Corps responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the project lands, waters, and associated resources.

The integrated Environmental Impact Statement is a programmatic document which is designed to address the current operation of the lake and its facilities and evaluate the proposed level of future development. Additional National Environmental Policy Act (NEPA) documentation will be required for any construction activities undertaken as a result of the updated Master Plan.

1.2 Study Authority

The 1995 Energy and Water Development Appropriations Act (Public Law 103-316, 108 Stat. 1701, dated 26 August 1994) authorized the Jennings Randolph Lake Master Plan Update. The language states that "[the] Corps is directed to use available funds to initiate work on a revised master plan for Jennings Randolph Lake to reflect changing demands. To the extent practical, the Corps should consult and work with all affected interest groups in developing the revised plan." This document updates the 1973 Master Plan for the Jennings Randolph Lake project.

1.3 Scope of Study

The updated Master Plan has been prepared in accordance with Engineering Regulation (ER) and Engineering Pamphlet (EP) 1130-2-550, Chapter 3, Project Master Plans and Operational

Management Plans, dated November 1996. This regulation prescribes "an overall land and water management plan, resource objectives, and associated design and management concepts" that provides the "best possible combination of response to regional needs, resource capabilities and suitabilities, and expressed public interests and desires consistent with authorized project purpose." Additionally, as specified in the regulation, the master plan contributes to "providing a high degree of recreation diversity within the region;" emphasizes the "particular qualities, characteristics, and potentials of the project;" and exhibits "consistency and compatibility with national objectives and other state and regional goals and programs."

The update process included review and evaluation of the 1973 Master Plan, data gathering, analysis of economic and environmental impacts of the alternatives and proposed plan, formal and informal in-house and agency coordination, preparation of preliminary conceptual and alternative plans, a public involvement program, discussion of the issues and special consideration inherent to the project, and selection of a proposed plan.

1.4 Study Area

Jennings Randolph Lake, formerly named Bloomington Lake, is located on the North Branch of the Potomac River in Garret County, Maryland, and Mineral County, West Virginia, approximately 8 miles upstream of Bloomington, Maryland, and approximately 5 miles north of Elk Garden, West Virginia (Figure 1-1). Project lands occupy approximately 4,500 acres of land. The dam at Jennings Randolph controls a drainage area of 263 square miles, and is a key part of the North Branch Potomac River floodbasin control system.

1.5 Integration of NEPA Documentation into the Master Plan

The National Environmental Policy Act (NEPA) of 1969, as amended, requires documentation of existing conditions and potential impacts of any Federal undertaking. The NEPA documentation for the Jennings Randolph Lake Master Plan Update has been incorporated into the Master Plan Update itself. Because future development and expected use levels at the project are higher than was described in the original Master Plan and Environmental Analysis, an EIS is the appropriate NEPA documentation for the Master Plan Update. The integrated EIS is a programmatic document which is designed to address the current operation of the lake and its facilities and evaluate the proposed level of future development. Additional NEPA documentation will be required for any construction activities undertaken as a result of the updated Master Plan.

This document was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended; the Council on Environmental Quality (CEQ) Regulations (40 CFR, 1500-1508), 29 November 1978; and the U.S. Army Corps of Engineers Regulation (ER)200-2-2, *Procedures for Implementing NEPA*, 4 March 1988. The CEQ regulations require that the environmental significance of a proposed Federal action be documented and assessed prior to taking any action which would limit the choice of reasonable alternatives.

Future NEPA documents may be required for individual construction activities which occur as a result of this Master Plan Update. These documents will address the site-specific impacts of those projects.

1.6 Pertinent Prior Reports and Related Studies

Documents and studies related to the Master Plan update are listed in this section with the dates of publication. The Bibliography section contains the full annotation for each report or study.

- *Potomac River Basin Report-North Branch Potomac River above Cumberland,* 1963
- *Design Memorandum No. 1, Site Selection,* 1964
- *Design Memorandum No. 2, Hydrology and Hydraulics,* 1965
- *Design Memorandum No. 3, General Design Memorandum,* 1966; revised 1968
- *Operational Management Plan,* last revision, 1995
- *Jennings Randolph Lake Reallocation Feasibility Study,* DRAFT, 1996
- *Jennings Randolph Lake Section 1135(b) Study,* ongoing
- *North Branch Potomac River Environmental Restoration Reconnaissance Study,* 1995
- *North Branch Potomac River Environmental Restoration Feasibility Study,* ongoing
- *Bloomington Lake Pre-Impoundment Study,* 1984
- *Bloomington Lake Reformulation Study,* 1983
- *Master Manual for Reservoir Regulation North Branch Potomac River Basin,* DRAFT, 1996
- *Operations and Maintenance Manual,* 1984; revised 1984
- *Design Memorandum No. 18, Environmental Analysis,* 1972
- *Environmental Statement,* 1971
- *Maryland Land Preservation and Recreation Plan,* 1993
- *West Virginia Statewide Comprehensive Outdoor Recreation Plan,* 1993-1997
- *Pennsylvania's Recreation Plan,* 1991-1997
- *Design Memorandum No. 4A, Preliminary Master Plan,* 1966; revised 1969
- *Design Memorandum No. 14, Master Plan,* 1973; revised 1975 and 1978

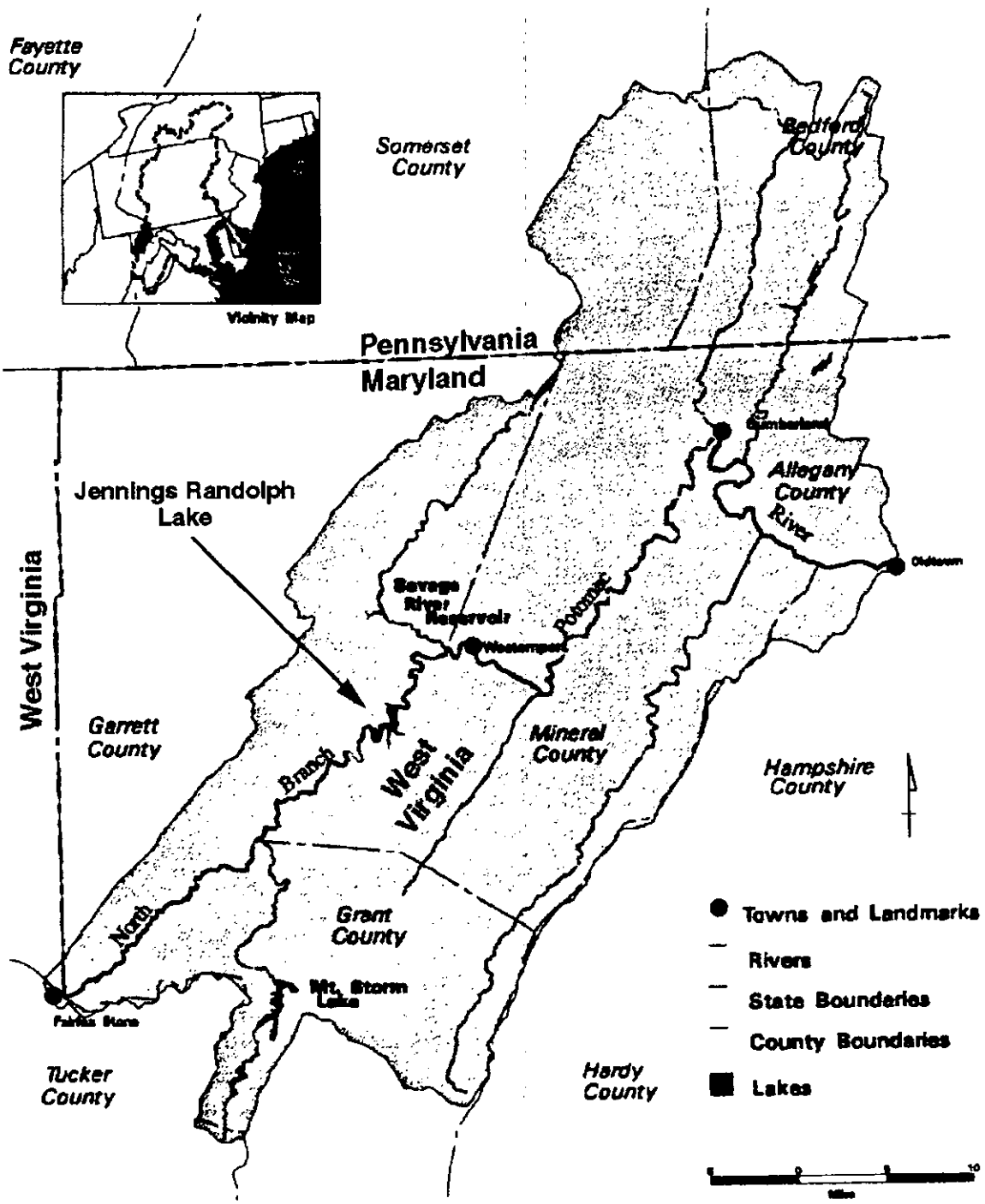

FIGURE 1-1
Location Map: Jennings Randolph Lake and North Branch Potomac River Basin

SECTION 2

EXISTING FEDERAL PROJECT

2.1 Authorized Project Purposes

Jennings Randolph Lake was authorized by the Flood Control Act of 1962 (Public Law 874, 87th Congress, 2nd session) which reads in part as follows: "The project for the North Branch of the Potomac River, Maryland and West Virginia, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers, in House Document Numbered 469, Eighty-seventh Congress."

House Document Number 469, 87th Congress, 2nd session contains the report of the Chief of Engineers, dated April 1961 and titled "Potomac River Review Report - North Branch Potomac River above Cumberland." This report recommended construction of a dam on the North Branch Potomac River at a site 2 miles above its confluence with the Savage River to provide flood control, domestic and industrial water supply, water quality control, and recreation. The project, as constructed, is actually 7.9 miles upstream of the confluence. Originally named Bloomington Lake, the project was rededicated in May 1987 with a new name, in honor of former West Virginia Senator Jennings Randolph, who made this and other Federal water resources projects possible.

Jennings Randolph Lake is located on the border between Maryland and West Virginia, in the North Branch Potomac valley, approximately 8 miles upstream of Bloomington, Maryland, and about 5 miles north of Elk Garden, West Virginia. The dam controls a drainage area of 263 square miles, about 20 percent of the total North Branch basin, and prevents nearly half the yearly flood damages that used to occur along the North Branch Potomac River. The project was designed to reduce flood damage, to improve downstream water quality, to provide a source of water supply for municipalities and industry downstream, and to afford public recreation opportunities.

Construction of the project began in 1971 and took 10 years to complete at a total cost of approximately $175 million. Impoundment of water to form the lake was completed in June 1982. The Maryland Potomac Water Authority, an agency of the State of Maryland, contributed funds to cover the initial water supply costs of the project, and continues to purchase long-term water supply storage space in the reservoir.

The seasonal pool level provides a surface area of 952 acres and a shoreline of 13.6 miles, and extends upstream from the dam for a distance of 5.5 miles along the streambed. The project is located in a narrow, winding valley typical of the many streams and rivers in the central Appalachian area. The slopes forming the shoreline are wooded and steep, severely limiting the development of recreation areas adjacent to the seasonal pool. The rugged topography in and around the lake discourages the construction of access roads, particularly on the Maryland shore.

At full conservation pool, the lake stores approximately 94,700 acre-feet of water. This translates into a volume of about 31 billion gallons of water that can be used for water supply, water quality improvement, and recreation. The project provides about 2,700 acre-feet of sediment storage, 92,000 acre-feet for low-flow augmentation and recreation, and a maximum of 36,200 acre-feet above the conservation pool level for flood control. The low-flow augmentation is subdivided into two portions: (1) 40,995 acre-feet of municipal water supply storage for the Washington, D.C., region, and (2) 51,005 acre-feet for water quality control.

In accordance with the provisions of the project authorization, 33.2 percent of the project construction costs, an estimated $57,876,000, are a non-Federal responsibility and are to be repaid in accordance with the Water Supply Act of 1958. Currently, the metropolitan Washington, D.C., area water suppliers that withdraw water from the Potomac River are under contract to purchase the water supply storage. An initial 7,158 acre-feet of water supply storage was purchased in November, 1970. The remaining water supply storage (33,837 acre-feet) is under contract as future water supply storage, with payments from the non-Federal sponsor beginning upon initial usage.

Releases from Jennings Randolph Lake are coordinated with releases from the nearby Savage River dam to maintain the water quality in the North Branch Potomac River. For many years, the highly acidic water draining from abandoned coal mines severely degraded the water-related habitats of the North Branch Potomac River. Jennings Randolph Lake is authorized to correct this acid balance, thereby providing a measure of water quality control in the river downstream of the dam. When acid mine drainage enters the Jennings Randolph Lake, the acid stratifies at a particular depth. Corps of Engineers personnel periodically test the water in the lake at various levels to determine the location of the "acid layer." Water is then selectively drawn from a low-acid layer of the reservoir. To accomplish this, the intake control tower has five pairs of intakes, each pair at a different elevation. Each intake can be individually opened to provide the best available mixtures of water and acid for release downstream.

Occasionally, the water quality releases will affect other aspects of the project, primarily lake-related recreation. Higher outflows from the lake to reduce downstream pollution may result in a lower lake level. This, in turn, may require closing of the boat launch facilities in late summer or early fall, even though the weather is still suitable for boating and water skiing. The benefits from water quality are best demonstrated by the highly successful trout fishery in the river below the dam, an area that was totally devoid of aquatic life before the dam was constructed.

2.2 Project Data

2.2.1 Dam

The dam, one of the largest rolled earth and rockfill dams east of the Mississippi River, is 296 feet high and 2,130 feet long. The crest width is 25 feet, and the top elevation of the dam is 1,514 feet national geodetic vertical datum (NGVD), which provides a freeboard of 5.1 feet above the spillway.

A rolled earth and rockfill dike, 900 feet long and 90 feet high, is located across a low area on the left abutment of the spillway. The crest width is 25 feet, accommodating a gravel maintenance road.

2.2.2 Spillway

The spillway, located on the left abutment, has a crest length of 210. The weir is an ogee section, gated and founded on bedrock. The elevation of the spillway crest is 1,468 feet NGVD, which is 2 feet above the conservation pool level. The spillway contains five tainter gates that are 42 feet wide and 32 feet high. Operating machinery for the tainter gates is located downstream from the roadway deck on machinery frames anchored to the piers and abutments. Access over the spillway is provided by a service bridge.

2.2.3. Outlet Works

The outlet works are located within the right abutment and consist of an inlet channel and tower, a tunnel under the dam, a stilling basin, and an outlet channel. The length of the inlet channel is approximately 100 feet. The intake tower is located 1,080 feet upstream of the dam, along with a 30-foot-high operating house consisting of a dry well structure approximately 332-feet-high. Access from the right abutment is provided by a service bridge. The tunnel extends 2,092 feet between portals. The upstream invert is located at an elevation of 1,255 feet NGVD and the outlet portal invert elevation is 1,238.3 feet NGVD. Except for the transition, the diameter of the inverts are 16.3 feet. A stilling basin with baffle blocks and end sills is provided downstream from the outlet portal to dissipate the energy of the high velocity tunnel flow. A flared transition includes a parabolic drop from the portal to the stilling basin floor. The basin is 64 feet wide and 116 feet long.

2.2.4. Reservoir

The reservoir impounds 94,700 acre-feet of water along 5.5 river miles at the seasonal pool level. The seasonal pool, elevation 1,466 feet NGVD, is approximately 2,600 feet wide, and provides a lake of 952 acres with 13.6 miles of shoreline. If the reservoir reaches the designed flood control lake, elevation 1,500 feet NGVD, it will cover 1,184 acres and extend 6.6 river miles upstream of the dam.

2.3 Reservoir Operation

Jennings Randolph Lake reservoir is operated, according to the Reservoir Regulation Plan, to (1) reduce flood flows at downstream damage centers on the North Branch and the main stem of the Potomac River, (2) improve downstream water quality via low flow augmentation, (3) supply water to Washington, D.C., and the local region, and (4) provide public recreation.

Because Jennings Randolph Lake is a multi-purpose project, priorities for reservoir regulation are occasionally adjusted. Flood control is always the highest priority; priorities for project purposes

other than flood control are constantly reevaluated. For instance, some water quality storage may be temporarily used for flood control storage during the winter.

When flooding is not likely, releases from the lake are usually adjusted to approximately the inflow rate, if the conservation pool is full (1,466 feet NGVD). When water quality or water supply needs occur, releases are made for these purposes. Additional detailed information may be found in the Master Manual for Reservoir Regulation, Appendix A (October 1996).

Flood Damage Reduction. Key damage centers located on the North Branch sub-basin are Luke, Westernport, and Cumberland, Maryland; and Piedmont, Keyser, and Ridgely, West Virginia. During August and September, the lake is allowed to draw down in anticipation of winter storage. Winter storage occurs between elevations 1,410 and 1,420 feet. Lowering of the lake to these elevations will provide adequate water storage during the winter and spring for flood control purposes.

Water Quality. Regulation of Jennings Randolph Lake is coordinated with the Savage River Reservoir that was placed in operation in 1952 and is used primarily for low-flow augmentation. Low-flow releases from Jennings Randolph Lake supplement flows in the North Branch and Potomac River for water supply and quality control. Jennings Randolph Lake exhibits both thermal and chemical stratification. In order to maintain suitable quality of releases, 5 pairs of outlets are provided. These outlets are controlled by 72-inch butterfly valves at elevations 1,449; 1,426; 1,400; 1,375; and 1,342. A systematic sampling program determines pH, acidity, temperature and other pertinent parameters at each of the intake port positions.

Jennings Randolph Lake experiences wide pool fluctuation (pool elevation 1,395 feet to 1,466 feet) because the water quality storage is used for flow augmentation during low flow periods and is refilled when inflow exceeds its requirement. The pool normally reaches the conservation pool in the spring. From mid-May through mid-June, the pool will be lowered 3 to 4 feet below the conservation pool. In late June, the pool can regain the conservation pool if sufficient inflow makes it possible to do so. The pool is generally below the conservation level in late summer and fall due to water quality and water supply releases.

Water Supply. Releases from the water supply storage are made only at the request of the water supply purchasers. The authorized minimum flow at Luke is 93 cubic feet per second (cfs), and for water quality purposes is 120 cfs. The minimum flow is composed of releases from Savage River Reservoir and Jennings Randolph Lake. The minimum outflow from Jennings Randolph Lake is 50 cfs. When water supply releases are made, the flow at Luke is 120 cfs plus water supply release. Jennings Randolph Lake fluctuates between elevation 1,320 and elevation 1,466 when making water supply releases. The pool will not be lowered to elevation 1,320 feet NGVD (10,000 acre-feet storage) due to the absolute minimum water quality storage needed for dilution in the lake.

Recreation. To accommodate in-lake recreation for boating, the pool is generally maintained above 1,455 until Labor Day. After Labor Day, boat access below elevation 1,455 feet, from the Howell Run Boat Launch is available without the use of the launch ramp. The Maryland Boat

Launch, which opened in March 1997, provides access from elevation 1,420 feet NGVD to 1,500 feet NGVD.

2.4 Land Classification

Land classification was done when the project was originally constructed. The classification process refines the land allocations to fully utilize project lands and must consider public desires, legislative authority, regional and project specific resource requirements, and suitability. Land at Jennings Randolph is classified into one of the categories listed in the following paragraphs.

2.4.1 Project Operations

This classification category includes all project land required for the structure, operation, administration, or maintenance of the project. Approximately 1,200 acres at Jennings Randolph Lake are allocated to project operations, including the maintenance shop and office buildings located on the right abutment of the dam. The maintenance shop consists of a radio room, heater room, workshop, storage, and garage facilities. The two office buildings house the ranger office and the park manager's office, and are located next to the overlook on the right bank.

2.4.2 Recreation

The recreation category includes land developed for intensive recreational use by the visiting public. This category includes approximately 450 acres of land.

2.4.3 Mitigation

This classification includes land acquired or designated specifically for mitigation. The project does not have any mitigation lands.

2.4.4 Environmentally Sensitive Areas

These areas include land where scientific, ecological, cultural, or aesthetic features have been identified. The project does not have land classified as environmentally sensitive areas.

2.4.5 Multiple Resource Management

Approximately 2,850 acres of project lands are classified as Multiple Resource Management areas, and are managed for one or more of the activities in the following paragraphs.

Recreation - Low Density. This sub-classification includes low-density recreation activities such as hiking, primitive camping, wildlife observation, hunting, or similar low density recreation activities. Low density recreation areas would include the Maryland and West Virginia Overlooks, the three hiking trails, and the Borrow Area (group camping). Hunting is permitted at Jennings Randolph Lake except within the recreation areas.

Wildlife Management - General. This sub-classification includes areas that have been evaluated for consideration for lease or license to State wildlife management agencies. The Maryland Department of Natural Resource holds a 1-acre lease to operate a trout-rearing pen in the stilling basin.

Vegetation Management. This sub-classification includes project lands that are managed for the protection and development of forest and vegetative cover. The project does not have land sub-classified as vegetation management.

Inactive and/or Future Recreation Areas. Project lands in this sub-classification include recreation areas that are planned for future development or that have been temporarily closed. There are no inactive areas at Jennings Randolph Lake project.

2.4.6 Easement Lands

Easement lands include all lands for which the Corps holds an easement interest but not fee title. Jennings Randolph does not have any project land in this classification.

2.5 Infrastructure

2.5.1 Project Access Roads

A series of crushed stone access roads connect the dam, outlet works, spillway embankment, connecting channel, and maintenance complex. A road from the right abutment overlook, down the downstream face of the dam, provides access to the outlet works and to an area on the left bank below the spillway; this road is not open to the public.

The recreation sites located in West Virginia may be accessed by the public from Keyser, West Virginia via WV SR 42 to WV SR 46; these are paved, two-lane state highways. The road from Maryland is WV SR 46, a two-lane dirt and gravel road originating in Luke, Maryland, that changes to a paved road about 1 mile northwest of the project. Another access from Maryland is MD SR 38 to WV SR 42, to Elk Garden, to WV SR 46, to the project.

Access to the Maryland Overlook is provided by MD SR 135 via Walnut Bottom and/or Chestnut Grove Roads. The Maryland Boat Launch is accessible by MD SR 135 via Mt. Zion road.

2.5.2 Sanitary Facilities

All facilities, except boat launching ramps, are sited above the full pool at elevation 1,500 feet NGVD. The sewage system serving the administrative and maintenance buildings, and the West Virginia Overlook is a standard gravity septic system composed of service and trunk lines, a 1,000-gallon septic tank, a dosing tank, a distribution box, a sand filter, a chlorinator house, and outfall lines. The sewage system serving the campground and dumping station consists of a holding tank which is periodically pumped out by a local vendor, through a service contract with

the Corps. Vault latrines have been provided at the Howell Run Picnic Area and the Howell Run Boat Launch because of the areas' remote location.

Solid waste is generated at several recreation areas along with the maintenance and office buildings. The recreation areas require servicing on a seasonal basis, and the maintenance and office buildings require year-round servicing. Disposal of waste generated at these areas is done by a local vendor through a service contract with the Corps.

2.5.3 Water Supply

Water is supplied to the campground by an above ground water storage tank. The handpumps, located throughout the campground, are gravity fed from the tank. The administration/maintenance complex and the West Virginia Visitor's Center is served by a 500 foot well. Water is not supplied at either the Howell Run Picnic Area or the Howell Run Boat Launch.

SECTION 3

FEDERAL PROJECT OPERATIONS

This section addresses operations at the Federal project, including management of the project lands and natural resources. It includes a description of the current practices, objectives, and policies for project operations.

3.1 Forest Management

3.1.1 Existing Resources

The major forest types on the project lands are oak, spruce, fir, and mixed northern hardwoods. Large-scale logging and fires in the 19th century significantly reduced the numbers of spruce trees in the project area. Existing second-growth forests are dominated by broad-leaved deciduous trees. Common tree species in the lower slopes include American basswood, tulip poplar, and red maple. Upper slope trees include red and white oak, chestnut oak, hickories, and sugar maple. Approximately 80 percent of the trees on the property are mature canopy-layer trees, 30 to 50 years old.

Forest species unique to the area include overstory species such as black maple and black ash; understory species such as smooth azalea, winterberry, alternate-leafed dogwood, flowering dogwood, redbud, serviceberry, and burning bush; and herbaceous layer species such as bladderwort, great Solomon's seal, Dutchman's pipevine, Dutchman's breeches, and snow trillium.

Rare and Threatened Species. Snow trillium is a Maryland Highly State Rare Species (S1). This means that this species is "critically imperiled in Maryland because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres in the State) or because of some factor(s) making it especially vulnerable to extirpation. Species within this rank are actively tracked by the Natural Heritage Program."

Black Ash is on the Maryland State Watch List (S3). This means that this species is "[r]are to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with this rank are not actively tracked by the Natural Heritage Program."

The bladderwort, depending on the species, could be a State Highly Rare or State Watch List species.

3.1.2 Management Objectives

The main objective of the Jennings Randolph Lake forest management plan is to increase the value of project lands for wildlife, recreation, and timber, by promoting natural ecological conditions through conservation practices.

3.1.3 Management Practices

The forest management strategy is a flexible framework for managing timber and forest resources to support wildlife and recreation as changing needs warrant. Preservation of aesthetics and species diversity is a large part of this framework.

The forest resources at the project are not particularly well suited to timber production. This is due primarily to steep slopes and potential aesthetic impacts. Slopes on the project lands range up to 65 percent. The erosion potential at slope sites is moderate to severe, making timbering an unfavorable option. Many forest sites are also clearly visible from the lake and recreation areas, making these sites unfavorable for timbering due to aesthetic impacts. For these reasons, the forest management program is aimed at protecting and enhancing forest lands for wildlife and recreation. Vegetation, either living or dead, is removed only for disease control, pest control, fire hazard reduction, flood clean-up, construction, or dam maintenance.

Timber Sales. In accordance with ER 1130-2-550, all forest products generated through clearing, salvage operations, sanitation cuts, or operation and maintenance, and not required for Corps use, will be sold after approval of a disposal plan. Currently, there are no plans for the sale of timber from the Jennings Randolph Lake project.

Fire Protection and Erosion Control. The objectives of the project's fire protection and erosion control procedures are to maintain and preserve the diverse vegetative cover and to protect it from wildfire, insects, and disease. These practices are meant to enhance the health and vigor of the forest cover by protecting the watershed from erosion, and to maintain high water quality by reducing runoff and siltation.

Through normal operations and patrols of the Jennings Randolph Lake project, the ranger staff will note any areas that may be susceptible to fire damage, such as those areas with heavy concentrations of grapevines, which cause damage by uprooting or breaking trees. If it is necessary to remove the hazardous or damaged vegetation, the work will be scheduled for completion as soon as practical. If the Project Manager feels that the job is too large for project staff, the manager will have the work performed by a contractor.

As authorized in Title 42, U.S.C., Sec. 1856a., the Corps may enter into reciprocal agreements with responsible fire organizations for fire protection of Corps properties. Such agreements would include a waiver of all claims for compensation for any loss, damage, personal injury, or death resulting from the performance of the terms of the agreement. The agreement may also provide for the reimbursement for all costs incurred in furnishing fire protection on Corps lands. At the present time, the Jennings Randolph Lake project has no such formal agreement with any

agency for fire protection. However, the Elk District Fire Company on the West Virginia side of the reservoir will respond to calls from the Corps and will provide protection for those portions of the project. They are well equipped to handle all types of fires, including forest, grass, and structural fires. In the case of a fire in the operations area, such as at the spillway, the Elk District Fire Company is notified, because they are able to respond more quickly in this sort of crisis, even if the fire technically occurs on the Maryland side of the project.

In the event of a fire on the Maryland side of the project, Garrett County Civil Defense can be reached by dialing 911 or by radio. Emergency radios are located in the vehicles of the Reservoir Manager, Head Dam Operator, and Chief Ranger, and at the base station in the Manager's office. The Garret County dispatcher will alert the closest available unit to respond to all fires. Fire personnel respond to the call, and are directed to the specific location of the fire by project personnel.

The Corps maintains some minor firefighting equipment on-site, such as fire rakes, Indian backpack pumps, a 525-gallon water bladder, and a backhoe. The project staff are trained to contain a fire until trained firefighters arrive on the scene.

The forest resources of the project lands are maintained, in part, to prevent soil erosion and its accompanying water quality degradation. Erosion noted on the project site is corrected as funding and manpower become available to address the problem.

3.2 Wildlife Management

3.2.1. Existing Resources

Common mammals on the project lands include white-tailed deer; black bear; gray, red, flying, and fox squirrels; gray and red foxes; skunks; raccoons; opossum; groundhogs; bobcats; and cottontail rabbits. Beaver, minks, and muskrats occasionally occupy the reservoir and its tributaries, but the fluctuating water level in the pool is a limiting factor for them.

Jennings Randolph Lake and its project lands support a variety of birds, including locally abundant birds such as sparrows and finches. The lake also hosts numerous migratory ducks and geese each year, due, in part, to the improved water quality at the lake. The improved trout fishery attracts osprey and bald eagles to the area, some of which are nesting on the project lands. The bald eagle is the only threatened species known to exist on project lands.

3.2.2 Management Objectives

The primary objective of the wildlife management policy at Jennings Randolph Lake is to maintain and, if possible, enhance the current wildlife population at the project in the most efficient manner possible. Wildlife is managed in a manner that is complementary to other management activities.

3.2.3 Management Practices

Bird Habitat Enhancement. The ranger staff has constructed and maintained approximately 20 bluebird boxes at the project. The average success rate for these boxes is over 50 percent. Four wood duck boxes have also been constructed, but have not been successful. In 1988, the Songbird Trail was established adjacent to Maryland Overlook #2. This area is designed to attract a variety of bird species to the area via bird feeders and natural food sources.

Mammal Habitat Enhancement. The ranger staff has rejuvenated the old apple orchard on the property to be more productive. Cuttings from this project were piled or wind-rowed to provide cover for smaller mammals. This project also benefits insect species such as bees and butterflies, which feed on the decaying fruit.

Endangered/Threatened Species Habitat Enhancement. The bald eagle (Haliaeetus leucocephalus) is the only threatened species noted on the project lands. No attempt is currently being made to improve this species' habitat on the project lands.

Natural Resource Law Enforcement. West Virginia DNR and Maryland DNR enforce game laws at portions of the project within their respective states. An interstate compact for joint enforcement of natural resource laws and boating regulations was signed into law in 1996.

3.3 Aquatic Habitat and Fisheries Management

3.3.1 Existing Resources

Water quality in the Jennings Randolph Lake and North Branch Potomac River have improved significantly over the past 15 years, due, in part, to the efforts by Maryland and West Virginia resource agencies, the Virginia Electric Power Company, and operations at the lake itself. The improved water quality lends itself to fisheries development, and the lake has been stocked with a variety of fish species since 1983. Both Maryland and West Virginia continue to stock the lake with largemouth bass, smallmouth bass, walleye, channel catfish, and rainbow, golden, brown, and lake trout.

3.3.2 Management Objectives

The objective of the fish management plan for the North Branch of the Potomac River and Jennings Randolph Lake is to maintain and, if possible, improve the current fisheries on project lands. The long-term goal is to establish a self-sustaining sport fishery. Both West Virginia DNR and Maryland DNR have taken an active interest in the lake and river, and the fish management plan for the project reflects those interests.

3.3.3 Management Practices

Fisheries. Trout are reared in six pens in the lake's stilling basin. This operation is owned and maintained by the Freshwater Fisheries Division of Maryland DNR, through an agreement with the Corps. In 1995-1996, approximately 35,000 fish were raised in the DNR pens.

The cooperative stocking by West Virginia DNR and Maryland DNR has created an important regional trout fishery below the dam. In May 1995 approximately 3/4 mile of restricted area between the dam and Barnum, WV was open to the public for catch and release fishing. The stilling basin and the area immediately downstream of the basin remains closed to the public as a fish propagation area.

West Virginia does not have a structured stocking policy for Jennings Randolph Lake. They do stock different types of fish in the reservoir when the fish become available, but they do not actively attempt to get fish for the lake on a predetermined basis. In past years, West Virginia has attempted to stock channel catfish every other year to help maintain the population; also, they have stocked threadfin shad whenever possible. Unfortunately, they caution that they cannot assure us with any certainty that this practice will continue.

In 1989, approximately 60 fish habitat improvement structures were placed in the lake by the ranger staff, in cooperation with local sportsman's groups and Maryland Department of Natural Resources. Maintenance of these devices is the responsibility of the ranger staff.

West Virginia DNR and Maryland DNR conduct gill net fish surveys each year for monitoring purposes. Rotenone is no longer used as a sampling aid.

Aquatic Resources. Aquatic health of the North Branch Potomac River is monitored through yearly contracted biological sampling. In addition, Corps employees do limited sampling in the river below the dam.

The lake is zoned into three areas. (1) a no-wake zone around the boat launch ramp, (2) a restricted access area around the dam and intake tower, and (3) the remainder of the lake. There are no restrictions on boat size or horsepower. West Virginia DNR and Maryland DNR are the state agencies responsible for water safety.

3.4 Water Quality Management

3.4.1 Existing Resources

The North Branch of the Potomac River was a polluted, acidic river prior to the construction of Bloomington Dam (Jennings Randolph Lake) in 1981. The poor water quality was a result of drainage from strip mines and deep mines in the watershed.

Several factors have contributed to the improvement of water quality in the lake and downstream since 1981. Active mines upstream have been forced by regulations in both states to improve

treatment of discharges. Reclamation has occurred on some old inactive mines. VEPCO limes the water discharged from Mount Storm Lake to help reduce acidity. The great depth of Jennings Randolph Lake (250 feet in places) allows the acid to stratify in the lake. All of these factors combine to produce a lake and a portion of the downstream river capable of supporting a sport fishery at this time.

3.4.2 Management Objectives

The objective of water quality management at the project site is to regulate the reservoir in such a way as to conform to the specific provisions of the project's authorizing legislation and water management criteria defined in the reports prepared in the planning and design stages of the project. In addition, the goals for water quality management include provisions as set forth in the applicable authorities established after project construction, plus all applicable Congressional Acts relating to operations of Federal facilities.

3.4.3 Management Practices

Downstream discharge is made via the multi-port intake structure, which allows water from different levels of the lake to be mixed and ensures the consistent quality of water downstream. High volume discharges are made during times of high downstream AMD production to help dilute acids and other associated pollutants in the river below the dam. Releases are also made to maintain downstream stream and riparian habitat.

An annual report, the *North Atlantic Division Water Quality Management Report,* provides information on water quality for all Corps reservoirs in the Division, including the status of biological, chemical, and hydrodynamic parameters. The report also makes recommendations for management improvements.

3.5 Facility Maintenance And Management

3.5.1 Existing Resources

The Jennings Randolph Lake dam is a rolled earth and rockfill dam, 2,130 feet long and 296 feet high. The controlled spillway, located on the left abutment, has a crest length of 210 feet and has five tainter gates, 32 to 42 feet high. The outlet works consist of a 330-foot tower connected to a 16-foot diameter tunnel, 1,619 feet long. Two hydraulic slide gates in the tower control the flow of water through the tunnel. The project has several support buildings on-site, which include an administrative office, a ranger office, facility, and a maintenance shop and garage. Jennings Randolph Lake has developed recreational areas that include two overlooks, a picnic area, two boat launches, and a campground. A third boat launch is located downstream of the dam, on the North Branch Potomac River.

3.5.2 Management Objectives

Typical facility management includes the operation and maintenance of the flood control related structures, other structures, mechanical equipment, lands, and roads. Management objectives for the project's physical structures and equipment is to maintain them in good working order.

3.5.3 Management Practices

Mowing. Mowing at the facility is done as needed along the roads and parking areas, around the administration buildings, and in the primary recreation areas. The overgrowth of plant life on the dam has been reduced by spraying.

Pest Management. The site does not use pesticides or herbicides.

General Structural Maintenance. Minor maintenance and repairs are done by project staff on an as-needed basis. Any major structural maintenance would most likely be contracted out.

Outgrants. An outgrant is a method of contracting, leasing, or licensing fee title lands to others for a variety of purposes (such as scientific or educational study) consistent with the overall management objectives of the Corps. The Maryland Department of Natural Resources has two outgrants with the Corps, in the stilling basin trout pens and the a boat launch.

Monitoring. Every 5 years, an assessment is made of the facilities and activities at all Baltimore District Corps flood control projects. The latest assessment in 1992, performed by Arthur D. Little, Inc., was conducted as part of the U.S. Army Corps of Engineers environmental review program, using the Environmental Review Guide for Operations (ERGO) manual. This manual, developed by the Army, requires the use of environmental assessments to ensure compliance with all applicable Federal, state, local, Department of Defense, and Army environmental standards.

The 1992 assessment found no significant deficiencies in any of the protocols for the Jennings Randolph reservoir. The assessment found no major deficiencies, and only one minor deficiency; the lack of an "Unleaded Gasoline" label on the facility's pump stand. Two good management practices were also identified; the positive management and documentation of furnace inspections and analyses, and the positive management of waste oil at the site.

SECTION 4

EXISTING RESOURCES

Section 2 defined the existing Federal project operations as well as the physical and hydrologic characteristics of Jennings Randolph Lake. This section defines the existing recreational and environmental conditions or affected environment at the project. To reduce duplication of efforts and resources, most of the information in this section has been taken from *the North Branch Potomac River Water Resources Study Reconnaissance Report* (1995), the unpublished *Draft Feasibility Reallocation Report* (1996), and the *Draft Master Manual for Reservoir Regulation, North Branch Potomac River Basin, Appendix A* (1996) and updated as appropriate. Some of the information is included in this report by reference. Additional topographic and soils information was taken from the pre-construction *Design Memorandum No. 18: Environmental Analysis* (1972).

4.1 Watershed Characteristics

Jennings Randolph Lake is located in the winding gorge of the North Branch Potomac River through the Appalachian Highlands. The North Branch Potomac River descends 1,930 feet in the 36 river miles from its source to the dam site; from 3,150 feet NGVD to 1,220 feet NGVD.

The watershed above the dam has a drainage area of 263 square miles, is about 23 miles long and 12 miles wide, and is roughly rectangular in shape. The dam at Jennings Randolph Lake controls about 20 percent of the North Branch's entire drainage area. The principle tributaries of the North Branch above the dam site are Stony River and Abrams Creek. The watershed contains no natural lakes and only a few small marshy areas.

Two man-made reservoirs upstream of Jennings Randolph Lake are located on the Stony River. Mount Storm Reservoir, owned by the Virginia Electric Power Company (VEPCO), provides cooling water for an electricity generating station. This reservoir has a drainage are of 31.2 square miles, a normal pool area of 1,110 acres, and a storage capacity of 47,600 acre-feet. Stony River Dam is located upstream of Mount Storm Reservoir, but has been drained and abandoned.

The fourth reservoir located in the North Branch watershed is located downstream of Jennings Randolph. Savage River Dam is located on the Savage River in Garrett County, Maryland, approximately 4.5 miles above the confluence of the Savage River with the North Branch. The total drainage area is 104 square miles. The reservoir is operated in conjunction with the Jennings Randolph reservoir to augment stream flows in order to supply water for industries and to control water quality.

4.2 Topography

The terrain of the watershed is rugged, with steep, heavily wooded mountainsides and deep, narrow valleys through which the river meanders. The western two-thirds of the basin lies within the Allegheny Plateau physiographic province, while the eastern third is located on the margins of the Ridge and Valley province.

The Allegheny Plateau is a high, deeply dissected plateau bounded by an eastward-facing escarpment known as the Allegheny Front. Prominent ridges are the Allegheny Front (elevation 3,500 feet NGVD) and Knobly Mountain (elevation 2,850 feet NGVD) in the eastern portion, and Meadow Mountain (elevation 3,031 feet NGVD) and Backbone Mountain (elevation 3,278 feet NGVD) in the western portion. The basin topography and branching pattern of its minor stream channels are a result of the plateau and ridge geomorphology, and the sedimentary origin of the bedrock. Valleys slope toward the center of the basin, at which point the rivers and streams cut through the ridge lines at right angles into the valleys to the east. The most westerly of these basins is drained by the Savage River, which is joined in successive valleys by the North Branch Potomac River, George's Creek, and New Creek.

The Jennings Randolph project lands, therefore, have generally steep slopes, usually over 10 percent. Very few areas are suitable for construction of recreation facilities. For environmental planning purposes, slopes were grouped into three categories: gentle slopes, moderate slopes, and steep slopes.

4.2.1 Gentle Slopes

This category includes land with slopes of less than 5 percent. Gently sloping land requires little site modification, and is suitable for campsites, parking lots, play areas, and building sites. Drainage is often a problem on land with a slope of less than one percent. Gently sloping land provides the most logical and economically feasible sites for recreation and building sites, and has the least potential impact on the environment from these activities.

4.2.2 Moderate Slopes

This category includes lands with slopes of 5 to 10 percent, which encircle the flood plains of the streams in the project area. Moderate slopes require moderate site modification, have easy grades, and are suitable for building sites, roads, and most movement-based recreational activity (walking, bird watching, horseback riding). Many of the moderate slope areas have vegetation and cover that is well-suited for wildlife habitat. Soil conservation practices should be followed on moderately sloped land.

4.2.3 Steep Slopes

This category includes lands with slopes greater than 10 percent. Steep slopes usually require major site modification. Slopes greater than 10 percent are too unstable or steep for recreational development other than trail usage. Steeply sloping land is expensive to develop, and development can lead to erosion, poor accessibility, and other negative environmental and economic impacts.

Figure 4-1 illustrates these slope categories within the pre-construction project area. Many of the gentle and moderate slope areas are now under water, as can be seen by comparing this figure with the current project map.

4.3 Geology And Soils

4.3.1 Geology

The North Branch of the Potomac River flows generally northeastward in a deep, narrow valley entrenched in the mildly folded, broadly warped rocks of the Allegheny Plateau section of the Appalachian Physiographic Province (Figure 4-2). The Potomac River valley is a broad synclinal basin following the gentle down-plunging axis of the George's Creek syncline (sometimes known as the Potomac syncline). Near the Jennings Randolph site, the syncline divides, with the George's Creek axis veering westward, and the Stony River syncline continuing southwesterly.

Bedrock exposed in the basin is of the Pennsylvania age, and includes the entire Conemaugh and Allegheny series and part of the Pottsville series. There are no peculiar outcrops or geologic formations that would be of unusual interest to the general public except the rare "waffle rock" geology, which was created over a period of 300 million years due to the folding, fracturing, and weathering of the rock.

There is a rare geologic formation that occurs on the project lands. This formation was found by the former residents of Shaw, WV who brought it to the Corps' attention. The formation, referred to as the "Waffle Rock," is a sandstone from the Conemaugh formation of the Pennsylvanian System. The sandstone dates back to the time before the Appalachian Mountains were formed. During the formation of the mountains the sandstone was fractured and folded. The surrounding rock had a very high iron oxide content that by percolating ground water was extracted from the surrounding rock and deposited into the cracks of the sandstone. The iron oxide solidified around the individual quartz grains of the sandstone making a much harder rock. When the formation was eventually exposed to the weather, the sandstone without the iron oxide eroded away faster, due to its softer composition. A portion of the "Waffle Rock" is located at the West Virginia Overlook, and a smaller portion is on display at the Robert W. Craig Campground.

4.3.2 Soils and Erosion

Soils in Garrett and Mineral County were rated by the U.S. Soil Conservation Service (SCS) for suitability for recreational development. Soil properties considered for the rating include depth to bedrock, depth to seasonal high water table, slope, surface texture, and stoniness. Each soil type was rated by the degree of limitation--slight, moderate, or severe--that affects the construction, development, and maintenance of recreation facilities. The degree of limitation indicates the severity of problems expected to be encountered for the specific use: areas of slight limitation are well-suited for extensively used active recreation; areas of moderate limitation have one or more properties that make them less suitable for use, and would be more expensive to develop; and severely limited areas that are poorly suited for extensive recreational use.

The soils at Jennings Randolph Lake vary in depth to bedrock from 1.5 to 3.5 feet, and are typically very stony. Most areas considered to be well-suited for recreational development are either below the conservation lake or in areas of limited or difficult access; other areas are moderately to severely limited. The primary exception is the Robert W. Craig Campground, whose soils are slightly to moderately limited, and therefore suitable for recreational development. Figure 4-3 shows the categories of development suitability for the soils around Jennings Randolph.

The Howell Run facilities, including the Boat Launch and the Picnic Area, are both located in areas that are theoretically poorly suited for recreational development. The boat launch site required a minimum amount of earth moving, and was built up with fill material. Regrading, filling, and reshaping were required in the picnic area, along with construction of access roads and parking lots and subsequent reseeding and planting. As shown by this example, site verification of the soil characteristics must be completed to determine requirements for future development in selected undeveloped areas.

Many areas at the project have moderate to severe erosion problems due to the nature of the soils and the steep topography of the project land. The areas of erosion that affect operation and recreational use of the project are described in the following paragraphs.

West Virginia Access Road. When driving into the project from Rt. 46 the access road is bordered by a steep drop on the lake side of the road, and a steep rising slope on the right side. The right side is prone to slides especially during the spring and winter months, when the ground becomes saturated with water. In the Spring of 1996, this area experienced severe slides which blocked and undercut the road. This area has been fixed, but the potential remains for this type of slide to reoccur at any place along the access road due to the slope of the hill and the erodibility of the soils.

Approximately 2,000 feet from the administration building the hillside is slowly sliding toward the lake. Signs of the slide can be seen in the buckling of the road surface. Presently, the Corps is monitoring the movement of the hillside.

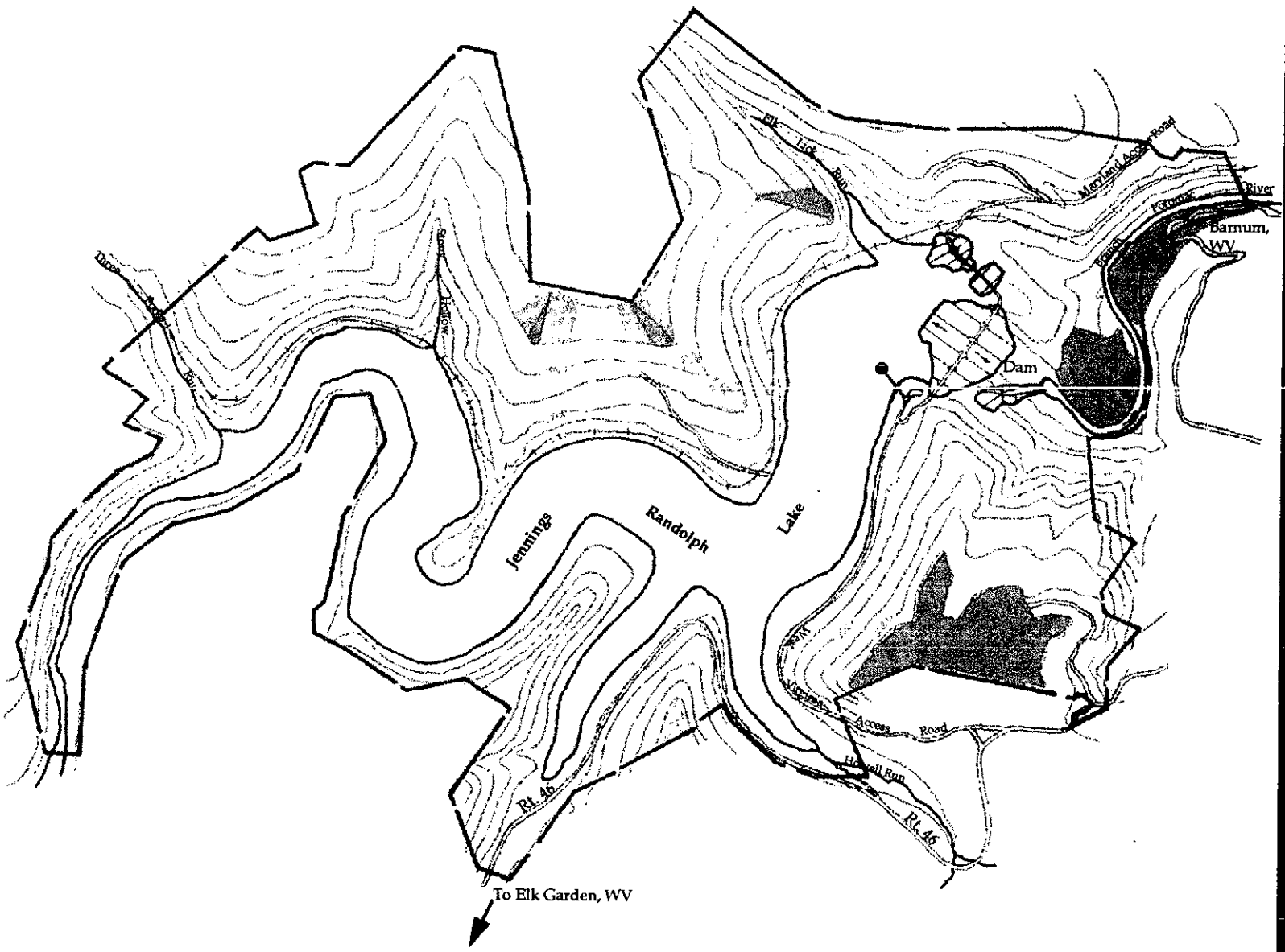

Figure 4-1
Slopes for Recreational Development

Legend

- < 10%
- 10% - 15%
- > 15%

Not to Scale

N

(due to computer manipulation)

Jennings Randolph Lake Master Plan
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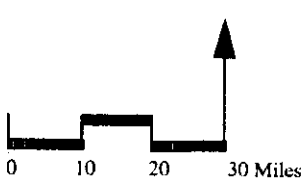

FIGURE 4-2
Physiographic Provinces of the Potomac River Watershed

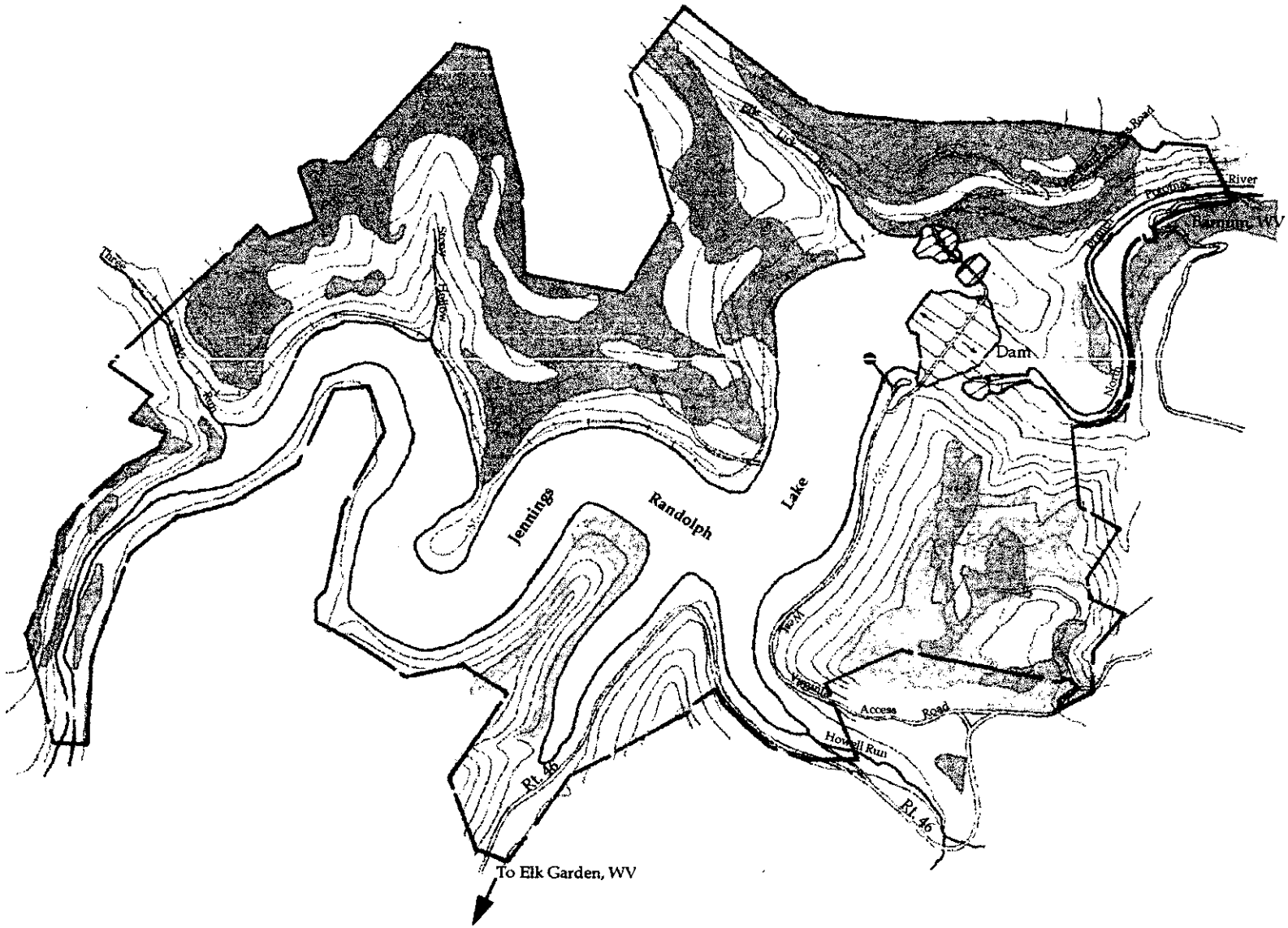

Figure 4-3
Soils for Recreational Development

Legend

- Well Suited
- Suited
- Poorly Suited

Not to Scale N

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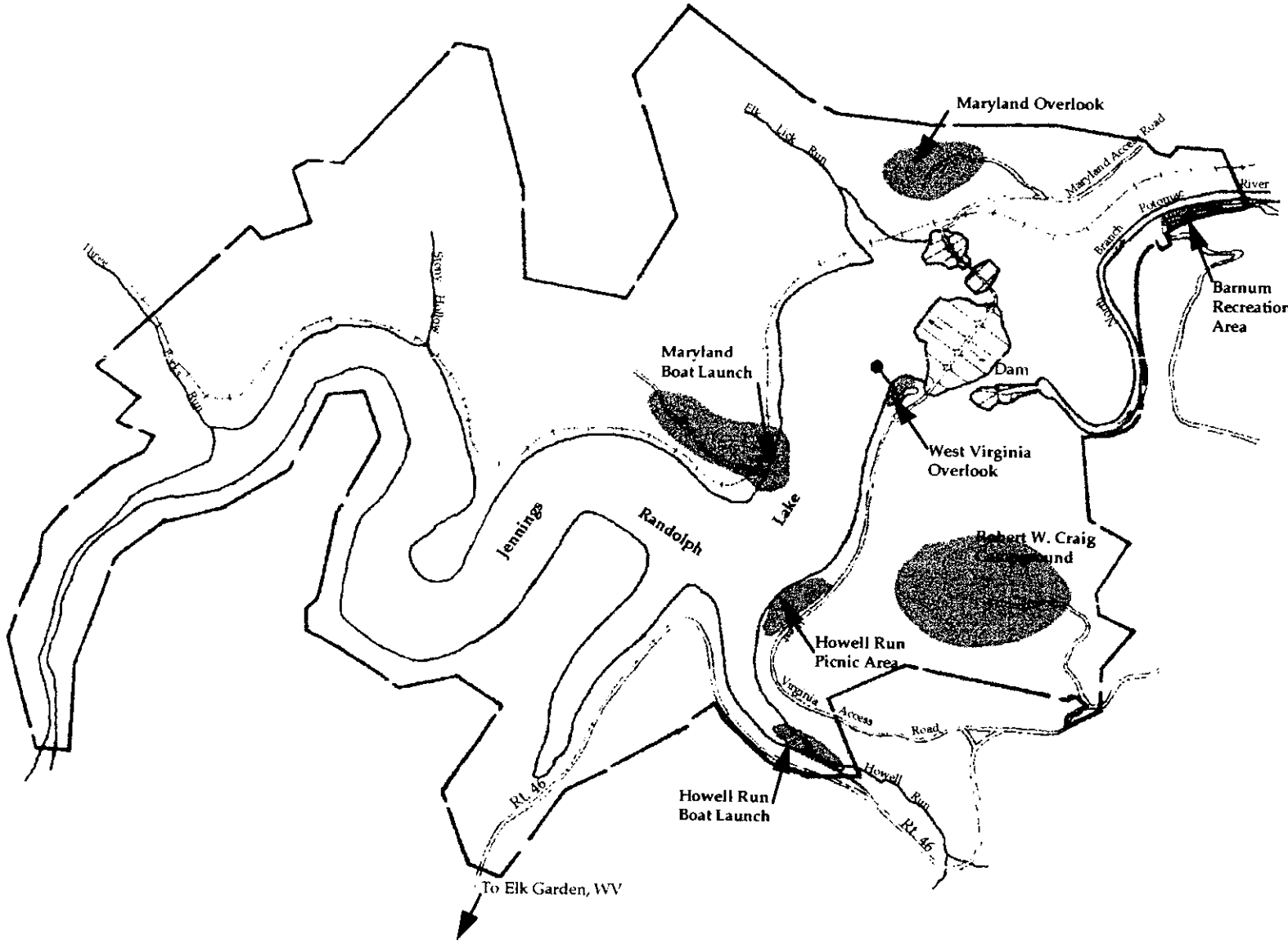

Figure 4-4
Existing Recreation Areas

Legend

Existing Recreation Areas

Not to Scale

N

Jennings Randolph Lake Master Plan
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Corps of Engineers

Howell Run Boat Launch. A drainage structure located between Rt. 46 and the boat launch, which empties into Howell Run is eroding around the structure and at the outlet headwall. The aprons of the structure are missing, and the outlet is closed due to the build up of sediment. The Corps is investigating ways to repair this structure. This erosion does not prohibit the use of the recreation area.

At the upper end of the parking area, Howell Run has undermined the gabion protection below the parking lot and has begun to undercut the parking lot. A small section of the road has been roped off from traffic; future erosion could severely impact the use of the recreation area.

Howell Run Picnic Area. The slope facing the lake is slowly eroding. The area is vegetated with crown vetch, but not in the eroded areas.

Maryland Overlook Access Road. A slide has caused severe deterioration of the road leading to the Maryland Overlook. The road surface has dropped approximately three feet vertically and moved two feet laterally. The recreation area will remain closed until the road is repaired.

4.4 Climate

The North Branch Potomac River basin is characterized by a temperate climate, with the average annual temperature ranging between 47 and 57 degrees Fahrenheit. The mean annual precipitation for the watershed is about 45 inches. Maximum and minimum amounts of annual precipitation of record at individual stations are approximately 89 inches (Bayard in 1926) and 20 inches (Piedmont in 1930), respectively. The greatest monthly precipitation in the basin occurs from May through August; the least occurs in the late fall and winter. The winters are not considered severe, but are vigorous, since there is usually heavy snowfall. The annual average snowfall is approximately 77 inches. Information on the major storms, floods, and droughts in the watershed can be found in the Draft Master Manual for Reservoir Regulation, Appendix A (1996).

4.5 Water Quality

One purpose of the Jennings Randolph Lake is to provide water quality control in the river downstream of the dam. The regulation of Jennings Randolph Lake for water quality improvement provides numerous benefits to both the in-lake and downstream environment and water users. This regulation produces uniform water quality downstream by eliminating extreme variations in pH and acidity. The impoundment traps and stores sediments and precipitates, allowing better quality water to be released, although the quality is no better than the long-term average quality of the existing river.

Since the early 1900's, the area has been strip-mined for bituminous coal, resulting in wide-ranging environmental impacts. This activity has created continuous problems of erosion, sedimentation, and acid mine drainage, thereby degrading river water quality. For many years, the

North Branch suffered from high acid content, the result of drainage from old, abandoned coal mines and poorly treated wastes from cities, towns, and industries. The major characteristics of mine drainage are the presence of sulfuric acid, heavy metals, and high dissolved solids. However, during the past 15 years, several Federal, state, and local agencies have been working to improve the water quality in the area. At present, approximately 40 miles of the North Branch and 100 miles of tributary streams are still somewhat affected by acid mine discharges. Measures being employed include waste treatment, reclamation of abandoned strip mines, lime treatment at Mount Storm Reservoir, and lime dosers. These measures have improved the water quality in this reach of the North Branch Potomac River to a pH of 6.0 or more.

4.6 Terrestrial Resources

Over 60 percent of the North Branch Potomac River basin is covered by forest. The Savage River State Forest and the Potomac State Forest are the major state-owned forest lands in the basin, and large private stands of timber remain as a part of the basin's hardwood timber industry. Agriculture accounts for approximately 25 percent of the land use in the basin. Farms are mostly small, and production is limited by poor soils. Former and active strip mines cover much of the basin. The remainder of the basin is utilized by industrial sites, rural and urban communities, and transportation corridors.

Approximately 80 percent of the land cover on the project property is deciduous forest. The most common species are American basswood, tulip poplar, sugar and red maple, and red, white, and chestnut oaks. Black maple, smooth azalea, winterberry, redbud, great Solomon seal and flowering dogwood are also found on the project lands. Among the most common species are American basswood, tulip poplar, sugar and red maple, and red, white, and chestnut oaks. Black maple, smooth azalea, winterberry, redbud, great Solomon seal and flowering dogwood are also found on the project lands. Extensive logging during the 19th century and fires on the over-cut areas reduced the number of spruce trees, and continuous harvesting has reduced the average age and size of the trees in the present forest.

Herbaceous rangeland comprises the remaining 20 percent of the terrestrial habitat of the project lands. Grasses and forbs predominate, but shrub/brush vegetation also occurs. Species found within this habitat are yellow poplar, black locust, fire cherry, blackberry, sweet clover, thistle, and crown vetch. Many wildflowers are also found in the area, including snow trillium, jack-in-the-pulpit, violets, painted trillium, and fireweed.

Most of the project lands are managed to retain the existing wilderness environment. Reported wildlife include bald eagle, osprey, white tailed deer, black bear, wild turkey, ruffed grouse, gray squirrel, and cottontail rabbit. However, the "second growth" forest, with its interspersed exposed land, probably limits the area's carrying capacity to support wildlife populations. Therefore, the ecological productivity of the area may not have as much value as other, more pristine, forested river valley ecosystems.

4.7 Aquatic Resources

In an aquatic ecosystem, species composition, relative abundance, and biological condition of the aquatic community are influenced by stream depth, width, velocity, substrate, habitat cover, turbidity, temperature, and chemical composition of the water. Since 1987, the water quality at Jennings Randolph Lake has improved to an average pH of 6.0, and has stayed relatively uniform. The recent water quality improvements are believed to be the result of mine reclamation efforts and state-sponsored water treatment stations upstream of the lake. These improvements have significantly reduced the quantity and toxicity of the mine runoff reaching the lake.

Numerous fish species inhabit the lake, including small mouth bass, lake trout, brown trout, rainbow trout, channel catfish, white sucker, largemouth bass, and walleye. The lake has minimum of shallow water habitat, due to the steeply sloping sides of the river gorge, which effectively diminishes the littoral zone. This factor works to prohibit the growth of aquatic vegetation, thus reducing the food base for resident fish. In addition, the fluctuating pool level and the absence of any other forms of cover such as stumps or downed trees makes the lake less suitable as fish habitat.

When Jennings Randolph Lake was constructed, the North Branch Potomac River was so highly acidic that no thought was given to sustaining a viable fisheries program at the new lake. The improved water quality has provided the previously unfeasible opportunity to create a good quality fishery in the lake and downstream. The present short-term goal of the fish management plan for the North Branch of the Potomac River and Jennings Randolph Lake is to maintain and improve the current fisheries, and the long-term goal is to establish a self-sustaining sport fishery. Both Maryland's and West Virginia's Departments of Natural Resources, in partnership with the Corps of Engineers, have taken an active interest in the lake and the river. The fish management plan, developed for Jennings Randolph Lake by the Corps of Engineers in cooperation with both states, reflects that interest.

4.8 Wetlands

Emergent wetlands have become established downstream of the dam as a result the dam construction, and are fed by incidental seepage and runoff. These wetlands are found in the seepage basins, along the river, and on the face of the emergency spillway.

4.9 Threatened And Endangered Species

The threatened bald eagle is found within the Jennings Randolph Lake project area. A pair of bald eagles established a nest on the southern end of the lake in 1993. Two eaglets fledged each year in 1993 and 1994, and three eaglets fledged in 1995. Currently an area of the lake is restricted from public use by buoys and a buoy line. No other Federal threatened or endangered species are found at the project, as confirmed by coordination with the U.S. Fish and Wildlife Service, dated 17 September 1996.

4.10 Prime And Unique Farmlands

Prime farmland is available land that provides the best combination of physical and chemical characteristics for producing crops. There are no prime and unique farmland soils within the project area. The most common soil types found on the project lands are stony and alluvial soils generally associated with floodplains, woodlands, and wildlife habitat areas. These soils are ill suited to farming.

4.11 Air Quality

The project is located in a rural area that exhibits good air quality. This area is an attainment zone for ozone, sulfur dioxide, particulate matter, carbon monoxide, nitrogen oxides, and lead, as defined by guidance published pursuant to the Clean Air Act Amendments (40 CFR 81.321).

4.12 Hazardous, Toxic, And Radioactive Substances

A hazardous, toxic, and radioactive substance (HTRS) preliminary assessment was conducted for the Jennings Randolph project lands to identify the existence of any HTRS in accordance with the *Water Resource Policies and Authorities Hazardous, Toxic and Radioactive Waste Guidance for Civil Works Projects* (26 June 1992). Coordination with state and Federal agencies indicated that HTRS was not present at the project or in the vicinity of the project area. No evidence of hazardous, toxic, or radioactive material that has the potential to contaminate the groundwater, surface water, or soils in the project vicinity has been found; nor is there any reason to suspect any. HTRS maps developed for the *North Branch Potomac River Water Resources Reconnaissance Study* are located in Appendix A.

4.13 Environmental Justice

This project is expected to comply with Executive Order 12989 - Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994). Neither low-income nor minority communities are located near the project lands.

4.14 Recreation

The region around the Jennings Randolph Lake project offers a variety of recreational opportunities in the states of Maryland, Pennsylvania, and West Virginia. Each of these states has numerous public recreation facilities provided by State, Federal, and local governments, which offer a wide range of recreational activities. A listing of these areas is located in Appendix A. These recreational resources have provided an important stimulus to the economic development of the region.

Although the primary functions of the reservoir are to improve water quality, water supply, and flood control, the project is also authorized to provide recreation above and below the dam.

Recreation resources are available throughout the project lands, and consist of opportunities for active and passive recreation. Appendix A includes the number of facilities at each recreation area and the associated carrying capacities. Camping, boating, sightseeing, and fishing are the main recreational attractions at the lake. Except for sightseeing, these forms of recreation can currently only be accessed from the West Virginia side of the reservoir. Developed recreation facilities include the Howell Run Boat Launch, Howell Run Picnic Area, Robert W. Craig Campground, and the Maryland and the West Virginia overlooks. Maryland DNR is currently constructing a boat launch with an associated access road, parking area, and a floating pier on the Maryland side of the lake, which is expected to open for the 1997 recreation season. Downstream recreation consists primarily of whitewater rafting and fishing.

The lake, which offers unlimited horsepower boating, has deep and shallow areas and small coves created by tributaries, providing diverse opportunities for boaters. The only boating constraints are the no-wake zone around the boat launch and the restricted area around the dam and intake tower.

The acidity of the water during the first few years of reservoir operation made it appear that fishing and swimming would never be possible at the lake. Therefore, only one water-based recreational facility was developed. However, reclamation of old mine sites and cleaner, more efficient production at current mine sites have reduced the quantity and toxicity of the mine runoff reaching the North Branch and the reservoir. Maryland DNR, Bureau of Mines, has lime dosers located upstream of the project, which assist in treating acid streams. Because of these efforts, the water quality in the reservoir is now sufficient to support water contact activities. Current lake activities include power boating, non-power boating, water skiing, fishing, and swimming. No formal swimming area exists at the lake; visitors swim at their own risk from boats or various areas on the shoreline.

4.14.1 Howell Run Picnic Area

The Howell Run Picnic Area is a well-maintained open space area, with a mowed lawn and young landscape plantings. The area is benched into a steep slope on the West Virginia side, which gives it an excellent position and a panoramic view of the lake and project lands. The picnic area is only open from dawn to dusk during the recreation season, and is closed during the winter months. It is primarily used for family picnicking and sightseeing, but is also frequently visited by various organizations for field trips and group outings.

4.14.2 Howell Run Boat Launch

The Howell Run Boat Launch is located in West Virginia, in a small cove at the upstream end of Howell Run. The boat ramp is open from April to October, except when the lake level falls below elevation 1,445 feet NGVD, or rises above 1,470 feet NGVD, when the ramp is unusable. In five of the past six years, the lake level has fallen below 1,445 NGVD as early as late July or early August, and has remained below 1,442 feet NGVD through the remainder of the boating season.

4.14.3 Robert W. Craig Campground

The Robert W. Craig Campground is located in West Virginia on a high ridge adjacent to the dam borrow area, approximately 3 miles from the lake. There are no physical connections between the campground area and the lake, but Sunset Trail, located at the entrance to the campground, offers a view of the dam and a portion of the lake. The campground operates May through September, with the highest visitation during holidays and weekends. Activities available in the area include camping, bike riding, hiking, picnicking, and sightseeing.

4.14.4 Overlooks

There are three overlooks at the Jennings Randolph Lake: two in Maryland and one in West Virginia. Normally, these are open year-round from dawn to dusk, and provide opportunities for picnicking, hiking, and sightseeing.

Maryland Overlook #1 is located just downstream of the project, and provides a panoramic view of the dike and emergency spillway structure. Maryland Overlook #2 is located on natural benches in the hillside upstream of the dam, and offers views of the lake and the intake control tower. Public access to this overlook and trail is currently prohibited due to a slide on the access road.

The two-story West Virginia overlook, which also serves as the project's Visitor Center, is located adjacent to the dam and the administrative complex. The view from the overlook encompasses the lake, dam, intake tower, dike, and spillway gates.

4.14.5 Trails

There are three trails at the project that are open from dawn to dusk. Two of the trails are located at the Robert W. Craig Campground. The High Timber Trail, a self-guided tree identification trail approximately 0.7 mile in length, is located directly west of the campground, following the natural contour of the land. The Sunset Trail, a 1.2-mile down-and-back trail, offers a panoramic view of the dam and lake. The trail winds through a wooded area, across a small stream, and through the old quarry area of the project, where roughly 85 percent of the earthen fill for the dam was obtained.

The third trail, Songbird Trail, is located on the Maryland side, and begins at Maryland Overlook #2. Songbird Trail was constructed in 1988. The trail is 1/4 mile long and ends at a waterfall and pond area that has benches, bird feeders, and squirrel feeders. As of this writing, public access to this trail is prohibited, due to a slide on the access road.

4.14.6 Downstream Recreation Resources

All fishing and recreational activities are restricted for approximately 1 mile downstream of the Jennings Randolph Dam. From that point on, anglers may choose any accessible public spot along the river for public boating and fishing. In 1990, Mineral County Parks and Recreation Commission (MCPRC) became a non-Federal sponsor to develop a downstream whitewater rafting/canoeing/kayaking and fishing access area near Barnum, West Virginia.

Since 1982, the Corps has received requests from various outfitting companies and canoe clubs to make scheduled whitewater releases from the project. In 1988, through the Water Resources Development Act of 1988, Congress added downstream recreation enhancement as an authorized project purpose at Jennings Randolph Lake. There are four tentative annual releases for whitewater events, subject to water availability. These events usually occur on the last two weekends of April and the first two weekends of May. These releases are normally pre-announced to inform any interested parties. In 1995, it is estimated that 600 to 700 whitewater enthusiasts participated in the events.

4.15 Aesthetics

Aesthetic resources at Jennings Randolph Lake include the lake, upstream and downstream river reaches, steep wooded hillsides, and all developed areas associated with the project. These aesthetic resources can be broken down into two categories, created and natural. The created elements include the recreation facilities, dam, and infrastructure. Natural elements include the wooded hillsides, upstream and downstream reaches, lake, and lake shoreline.

The project lands offer more natural aesthetic opportunities than does the rest of the regional landscape. The habitat evaluation conducted as part of the unpublished *Draft Jennings Randolph Lake Reallocation Report, Feasibility Study* (1996) identified two major terrestrial habitat types on the project lands: deciduous hardwoods (78 percent) and herbaceous range lands (21 percent). The two areas provide habitat to support a diverse variety of wildlife, and have been classified as being in good condition.

Most recreation facilities have been strategically sited to take advantage of natural features, and other areas have been created to blend with the natural context of the lake. For example, the Howell Run Picnic Area and the three overlooks are located on benches above the lake, on steep hillsides. Although the benches are artificial, they appear as natural features in the landscape, and are accented by the development of well-maintained passive recreation areas. The Robert W. Craig Campground is located on top of a mature wooded ridge above the lake, and the campsites and other support facilities are laid out to fit with the existing contours and wooded areas.

Among the created elements in the landscape at Jennings Randolph, the dam is probably the most unnatural in appearance. Its shape, size, absence of vegetation, and rock placement (rip rap) strongly contrast with the surrounding environment. Drawdowns of 50 feet or more also magnify

the visual contrast. The pattern of Jennings Randolph Lake, which is relatively narrow and sinuous, produces a series of bends and limiting views that adds to the visual variety of the surrounding steep, forested terrain. When the lake is below full conservation pool, the shoreline is devoid of any vegetation and detracts from the overall visual experience.

The area directly below the dam has also been considerably modified by construction. The stilling basin and dam strongly contrast to the surrounding area, which was once a wooded river bluff setting. The adjacent land is a successional meadow, which aids in softening the appearance.

The upstream area of the project has also been modified, but not as drastically as the downstream area. The mountain on the Maryland side of the lake was terraced to relocate a railroad line, and the land directly adjacent to the lake and Three Forks Run was used as a spoil area. Presently, the spoil area is in primary succession, which lessens the visual impacts. The old railroad bed and poured concrete bank stabilization slabs are located on the West Virginia side. The old bed is overgrown and therefore unobtrusive, but the concrete slabs are quite visible and visually conflict with the natural surroundings.

4.16 Periodic Effects Of Existing Reservoir Operations

As mentioned previously, the Jennings Randolph Lake project was originally authorized for flood control, water quality, water supply, and recreation. Reservoir operations for these purposes create periodic changes in lake level that affect recreation facilities and activities, and aesthetic experience. These temporary effects result from both the reservoir drawdowns and from flooding events, and are more visually apparent during the winter and spring, due to the degree of physical change and the duration of the drawdowns. This section defines those operations which have an effect on the existing resources at the project.

4.16.1 Drawdowns

Jennings Randolph Lake at full conservation pool is 1,466 feet NGVD. Lake elevations usually begin to drop during the later part of the recreation season. The only recreation facility affected by drawdowns is the Howell Run boat launch, which is inoperable at and below elevation 1,445 feet NGVD. The boat launch is typically inoperable from late August to middle February, which affects the last 3 to 4 months of the boating season, when the weather is still warm and suitable for such activities. Additionally, water-based recreation supported by the boat launch is also affected, including leisure boating, power boating, water skiing, and boatside fishing and swimming. In contrast, the Maryland boat launch was designed and constructed with current operation levels in mind. The boat launch is usable from elevation 1,425 to 1,480 feet NGVD. Therefore, this boat launch is likely to be operable for more of the year than is the Howell Run boat launch.

The existing fluctuation pattern also affects nature-based recreation resources, particularly the lake fishery. The shoreline between elevations 1,466 and 1,408 feet NGVD is nearly devoid of

submerged and emergent aquatic vegetation, due primarily to the long period of exposure during drawdowns. Such drawdowns also result in reduced cover, lower nutrient productivity, and poorer habitat for fish.

The greatest visual impact from the drawdowns is the unvegetated band that is exposed between the summer pool elevation and the successive drawdown pool elevations. This band is void of any vegetation, and can have a horizontal transition as great as 100 feet. The lack of vegetation and the gravel texture and color of the band significantly conflicts with the aesthetics of the natural surroundings. While these visual contrasts are significant, it should be noted that such effects occur at a time of year when annual recreation visitation is lowest.

The positive recreational effect of the drawdowns is the educational experience they can provide. The visual impact of the drawdowns illustrates the effect that droughts and human consumption can have on the environment. Placards, literature, and other education tools help visitors to better understand these impacts.

Other positive effects of drawdowns occur during water release itself. First, the water released is of a higher quality than that which would have flowed down the Potomac River had the dam not been constructed. This higher-quality water has significantly contributed to the revitalization of the downstream cold water fishery. Secondly, white water rafting, canoeing, and kayaking have recently become popular sports in the area as a result of the water quality releases.

4.16.2 Flooding Events

Flood events cause periodic short-term inundation of nature-based recreation resources. At Jennings Randolph Lake, as in most of the North Branch Potomac River, most flooding occurs during late winter and early spring, although flooding events can and do occur throughout the year. Most of the winter and spring flood control operations at the lake have little direct effect upon project visitation, because recreational facilities are not used during this time of the year.

The effects of flooding at the lake can be considered positive or negative, depending upon the viewer's criteria. Flood events normally cause the lake level to rise with water discolored by increased sediment load and debris. After the lake level returns to its normal pool, some sediment and debris remains along the edge of the lake and in the water itself. This sediment affects the visual quality of the lake until it is removed, is covered with vegetation, or settles to the bottom. Except for the deposition of mud and debris, the temporary rise in the lake elevation does not necessarily detract from project aesthetics. Viewers may enjoy the larger size of the lake during the flood stage, or may appreciate the flood control action itself. In addition, by reducing the exposed height of the dam, flood events also bring it more into scale with the reservoir.

Nature-based recreation resources at Jennings Randolph Lake do not appear to be affected by flood events to the same degree as do the developed recreation facilities. There are no significant adverse effects on fish or wildlife resources resulting from flood events, due to the brief duration

of these events. However, sustained high discharge following a flood event can cause nitrogen supersaturation of the outflow, which can result in high fish mortality in the stilling basin trout pens.

4.17 Cultural Resources

Historically, the project area has been affected by extensive ground disturbance from past surface and pit mining operations; timber harvesting; reservoir and dam construction; relocation of road, railroad, and utilities lines; and borrow and spoil areas associated with construction and relocation. The original spruce-fir and northern hardwood forest was reduced by 19th century large-scale logging, followed by fires in the cut-over areas. Coal mining has been extensive in the region for many years. Abandoned strip mines and timber harvesting on steep hillsides has exposed the land, contributing to erosion, sedimentation of streams, and acid mine drainage.

During the construction of Jennings Randolph Lake and dam, the land was cleared to ground level between elevations 1,395 and 1,469 feet NGVD. Except for removal of downed timber, no land was cleared below 1,395 NGVD. Numerous stockpile areas were created, both upstream and downstream from the dam; a practice that affected the ground surface and vegetation in these areas. Construction associated with the relocation of the Western Maryland Railroad tracks to the Maryland shore also caused extensive disturbance to shoreline areas above the conservation pool elevation. In addition, the communities of Shaw and Barnum, which represented economic development of the coal and timber industries, and all structures and dwellings within the lake, were razed in preparation of the dam construction.

In 1979, the Baltimore District performed a Phase I cultural resources investigation of the Jennings Randolph Lake project lands as part of the original reservoir and dam construction. This investigation was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, and its implementing regulation 36 CFR 800, "Protection of Historic Properties." Two previous investigations, in 1967 and 1970, interviewed residents that had collected a variety of Middle Archaic to Woodland Period projectile points on the floodplain within the reservoir boundaries; however, no sites were located during a surface inspection.

The District's 1979 investigation, conducted by Quinn and Gardner, assessed and documented prehistoric and historic resources by conducting a review of the existing literature and archival sources, cartographic review, interviews with persons knowledgeable of the area, and field examination (including auguring and shovel testing) of the project impact area between elevations of 1,330 feet and 1,500 feet NGVD. No sites were located during the surface inspection of the North Branch Potomac River floodplain area (Quinn and Gardner, 1979). The field investigation concluded that the project lands were largely disturbed by strip mining and lumbering operations.

The Draft Jennings Randolph Reallocation Reconnaissance report (1989) identifies three types of sensitive areas, but concludes that the potential for significant historic and pre-historic cultural resources in the Jennings Randolph project area is low. Consequently, the report proposes that a

limited Phase I investigation of the sensitive areas be accomplished during the next (feasibility) phase of the study.

The Phase I investigation was accomplished in 1991 for the unpublished Jennings Randolph Feasibility Report. Based on the reconnaissance study, sensitive areas were identified as stable alluvial flood plain surfaces, higher terraces, and rock overhangs located between elevations 1,466 feet and 1,484 feet NGVD. Map review indicated that potentially sensitive areas exist in the West Virginia study area at Howell Run, Deep Run, Chaffee Railroad Siding, Stone Cliff downstream of Chaffee, and the upstream end of the North Branch Potomac River, as well as in the Maryland study area at Three Forks Run, Stony Hollow, and Elklick Run. These areas were subject to a pedestrian survey and shovel test survey. Shovel tests were excavated in 15-meter intervals along single transects. All excavated soils were screened through one-quarter-inch mesh.

The results of the Phase I investigation determined that there are no significant historical artifacts or sites below elevation 1,484 feet NGVD within the project boundaries. Elevations below 1,466 feet NGVD were surveyed prior to project construction, and the project area between 1,466 and 1,484 feet NGVD was surveyed during the study for reallocation of the project. Also, no historic architectural resources were identified within the project boundary. These findings were reported to the Maryland and West Virginia State Historic Preservation Officers; letters of concurrence are included in Annex A.

4.18 Social And Economic Setting

4.18.1 Land Use

Table 4-1, in Appendix A presents the total land area and acreage of each land use type for the states and selected counties of Maryland, Pennsylvania, and West Virginia. These data are derived from 1990 information for the area within the Potomac River basin. For all counties in this area, forest was the dominant land use. This condition reflects the undeveloped nature of the region. Cropland or pasture land accounted for up to 14 percent of the total area of all counties within the market area in Maryland, Pennsylvania, and West Virginia. Urban land use accounted for less than 12 percent of the total area in all counties and West Virginia, while Maryland's urban land use was higher, due to the more highly developed areas surrounding Washington, D.C. These data are presented in Table 4-2, in Appendix A.

The State of Maryland Office of Planning updates land use information every 4 years. Unfortunately, the 1994 data was not available for this analysis. As shown in Table 4-3, in Appendix A, a significant change between the 1985 and 1990 data occurs in Garrett County. This county experienced a greater than 50 percent increase in urban land use over the 5-year period, primarily due to the urbanization of the Frostburg/Cumberland area. The States of West Virginia and Pennsylvania, unfortunately, do not have similar data for comparison.

4.18.2 Population

Historic and projected population data from 1990 to 2040 were reviewed for the three states in the Jennings Randolph market area. The information found in this section is listed by the ten counties which define the market area: two Maryland counties(Allegany and Garrett), six West Virginia counties (Grant, Hampshire, Hardy, Mineral, Morgan and Tucker), and two Pennsylvania counties (Bedford and Somerset). These areas are within the Bureau of Economic Analysis (BEA) regions BEA-016, BEA-020, BEA-009 and Metropolitan Statistical Area-(MSA) 1900. To facilitate regional economic analysis for the Jennings Randolph area it was necessary to look at how the region was divided into BEA geographical areas. The BEA looks at inter-area population movement by region.

Table 4-4, in Appendix A, presents population projections for the years 1990 through 2040, derived directly from the Regional Office of Planning for Maryland, Pennsylvania and West Virginia. These projections indicate level or steady growth for all BEA regions. However, there is substantial variation among regions. While both the United States and Maryland are predicted to increase in population by more than 9 percent, West Virginia's predicted growth is -0.2 percent by the year 2000, and +6.8 percent by 2040. Pennsylvania's growth over the same period is predicted to be more than +14 percent. It should be noted that growth predictions for the years 2000 through 2040 was not available for the State of West Virginia, so therefore the numbers were extrapolated for those years.

4.18.3 Employment

Total employment is predicted to increase substantially for the United States and Maryland from 2000 to 2040 (Table 4-5, Appendix A). However, the percent employment in West Virginia is predicted to have only 5 percent growth by the year 2000, with an overall decrease by 2040. All BEA regions in the study area show total employment growth over the next 40 years, with most of this growth predicted to occur in the next 12 years. Peak employment is predicted to occur by the year 2010, after which there is a either a decrease or a leveling in total employment predicted. There were no similar predictions available for Pennsylvania.

4.18.4 Households and Income

Information on household formation, percent change in total households, and the average number of persons per household between 1980 and 1990 is presented in Table 4-6, in Appendix A. For the United States, Maryland, West Virginia, and Pennsylvania, approximately 72 percent of total households are family, as defined by the U.S. Census Bureau. Garrett County, along with the six West Virginia counties, had the highest percentage of family households (75 percent), while Allegany County, Maryland, had the lowest (69 percent).

The percent change in total households between 1980 and 1990 varied between the states and counties (Table 4-7, Appendix A). The United States and Maryland had an increase in total

households between 1980 and 1990; 14 percent and 20 percent, respectively. West Virginia exhibited a slight increase, with less than 1 percent total household growth. Except for Allegany County, which had a slight decrease in total household growth, the other counties in Maryland and West Virginia exhibited growth of between 5 and 23 percent in total households for the 10-year period. Information for Pennsylvania was not available.

The average number of persons per household is given in Table 4-6. For the United States, the states of Maryland and West Virginia, and the five counties for which data was available, the average number of persons per household decreased by an average of 7.5 percent between 1980 and 1990. These data indicate a trend towards smaller households. Information for Pennsylvania was not available.

For all regions, per capita income is predicted to grow substantially in the next 50 years. By the year 2040, income is predicted to increase between 50 and 60 percent in the study area. Both the United States and Maryland are predicted to grow at similar rates, while income in West Virginia is predicted to grow at a lower rate. The growth rate of per capita income is greatest in BEA-020 and least in MSA-1900. This reflects the increases in both population and total employment in more developed regions such as BEA-020 and BEA-016. Information for Pennsylvania was not available.

4.19 Most Probable Future Without Project Conditions

Without implementation of a recreational development at Jennings Randolph Lake, it is expected that there would be little change from current environmental trends discussed above. The lake would continue its normal reservoir operations, and topography, water quality, wildlife, and other natural features of the project would remain the same without recreational development. The condition of wetland and terrestrial resources near the lake would change in the future due to natural ecological succession. Trees and shrubs on the Jennings Randolph Lake project lands would become more numerous and larger in some areas that are now dominated by shrubs or herbaceous vegetation. If recreational development at Jennings Randolph Lake remains unchanged, the aquatic habitat in the reservoir and downstream is expected to continue as it now is. Water quality within the reservoir is also expected to remain the same, or improve slightly over time.

There is a significant projected population and income growth in the region. The impact of this growth is likely to include increased demands for recreational resources. Without recreational development, the Jennings Randolph Lake project would be unable to meet this increased recreational demand. Additionally, the existing facilities will have a higher rate of use due to the increased recreational demand. This increased use will deteriorate the facilities more rapidly, resulting in higher required maintenance costs.